

II. Remarks

Claims 3, 5, 6, 8, 9, and 11-20 were pending in this application and have been rejected. The present amendment cancels claims 5, 8, 11 and 18-20, adds new claims 21-38 and amends claims 3, 6 and 9 to more particularly point out and clarify Applicants' invention. No new matter has been added by the present amendment. After this amendment, claims 3, 6, 9, 12-17 and 21-38 will be pending.

Reconsideration of the application in view of the above amendments and following remarks is respectfully requested.

Rejection(s) under 35 U.S.C. § 103

Claims 3, 5, 6, 8, 9, and 11-20 were rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,394,487 to Heudorfer et al. (Heudorfer) in view of U.S. Patent No. 6,343,811 to Hammer et al. (Hammer). Claims 5, 8, 11 and 18-20 have been cancelled by the present amendment and therefore, the rejections of claims 5, 8, 11 and 18-20 are now moot. In view of the amendments and remarks contained herein, Applicants respectfully submit that the rejections of claims 3, 6, 9, and 11-17 are traversed.

Applicants' present invention is concerned with (1) providing an air bag arrangement such that at an initial stage of a collision, the expanded air bag is relatively soft, such as for example, for protecting the head of the occupant. Then (2) at the latter stage of the collision, the expanded air bag has a relatively high tension across the entire air bag so as to be developed to its fullest, such as for example, for

restraining the occupant from being thrown out of the vehicle in the event of the vehicle turning over (e.g. rolling over). Applicants' application at paragraphs [0005]-[0007]. Among these two concerns, the first concern of providing a relatively soft air bag at the initial stage of a collision, which has been recognized by the Applicants of the present invention, was not publically known at the time of this invention, and has not been recited or suggested by any of the cited references.

The present invention gradually increases the tension of the entire airbag to eventually a stability high condition. A unique characteristic feature, however, of the present invention is that at the initial stage of the collision, the tension of the air bag is not maximized (e.g. not fully developed) and a certain margin (e.g. slack or looseness) is maintained across the air bag to address Applicants' first concern of providing a relatively soft air bag. The "tension" in this case indicates not the "internal pressure of each of the chambers" but rather the "tension in the forward and backward direction" of the air bag (See Figures 3 and 4).

In particular, Applicants' present invention provides the following features to address the above concerns:

Feature (A): the secondary chamber is expanded later than the primary chamber and therefore, the secondary chamber is at most minimally expanded if at all at the initial stage of the collision. At the latter stage of the collision the internal pressure of the secondary chamber is maximized, increasing the tension of the entire air bag to become eventually high. Moreover, at the latter stage of the collision, the internal pressures of all of the chambers (e.g. primary chamber(s) and secondary chamber(s)) become equal.

Feature (B): The virtual band connecting the front and rear ends of the air bag with the vehicle is positioned to overlap with both the primary and secondary chambers combined.

Features (A) and (B) result in the following effects:

Effect (I): the second chamber is at most minimally or nominally expanded at the initial stage of the collision and hence this chamber functions as "margin" (e.g. slack). The tension of the air bag therefore does not become fully developed. This increases the occupant's chances of protection without being harmed at the initial stage of the collision by the relatively soft air bag.

Effect (II): The "margin" or "slack" diminishes or disappears as the second chamber is expanded at the latter stage of the collision, and hence the tension is fully developed or maximized, reducing the possibility of the occupant from being thrown out from the vehicle due to the overturn of the vehicle for example, at the latter stage of the collision.

These two effects (i.e. Effects (I & II)) are obtained only when both the features (A) and (B) are provided together. Applicants' believe that because none of the cited references either individually or in combination disclose, teach or remotely suggest providing both the features (A) and (B) together and further, because the cited references fail to recognize the concerns associated with providing an air bag that is relatively soft at the initial stage of a collision for occupant protection, then it would not be obvious for one skilled in the art to even try and make the combine of elements from the references, which are disclosed as functioning differently from Applicants' invention, in order to arrive at the present invention.

Accordingly, Applicants have clarified the present invention by amending claims 3, 6 and 9 to recite that at least one secondary chamber is immediately adjacent to the primary chamber and defines an opening that provides direct fluid communication between the primary chamber and the secondary chamber so that the secondary chamber is expandable by receiving the inflow of gas directly from the primary chamber. This configuration of elements more particular recites the structure of the airbag of the present invention in providing the features and effects as outlined in the foregoing paragraphs. Support for these amendments may be found in Applicants' application in Figures 1, 5, 6 and 7.

Heudorfer discloses an inflatable air bag for a motor vehicle. The air bag 100 is configured to be connected to a gas generator 12 and includes a main chamber 170. The main chamber 170 is divided into a pair of large chambers 174, 178 and a spherical chamber 176. An upper narrow longitudinal section 175 of the main chamber 170 delivers gas to directly inflate both the finger shaper chamber 172 and the large chambers 174 separately. The finger shaped chamber 172 extends longitudinally away from the main chamber 170 and the finger chamber 172 is not in direct fluid communication with the large chamber 176 and accordingly, does not receive an inflow of gas directly from the large chamber 174. *Heudorfer* at col. 5, lines 36-59 and Figure 2. Notably, this is unlike Applicants' as recited in claims 3, 6 and 9 where the secondary chamber is immediately adjacent to the primary chamber and defines an opening that provides direct fluid communication between the primary chamber and the secondary chamber so that the secondary chamber is expandable by receiving the inflow of gas directly from the primary chamber, and the aperture and the opening are sized such that the aperture is substantially larger than the opening so

that the secondary chamber begins to substantially expand and develop after the primary chamber is approximately fully expanded and developed by gas from the gas generator. Accordingly, the air bag of Heudorfer is both structurally and functionally different from Applicants invention and therefore, these differences must be given patentable weight over the prior art. *In re Land*, 368 F.2d 210, 169 USPQ 226 (C.C.P.A. 1971) and *In re Mills*, 916 F.2d 680, 16 USPQ2d 1430 (Fed. Cir. 1990).

Hammer discloses a side air bag 10 for a motor vehicle. The side air bag 10 has a gas generator 38 and a plurality of gas chambers 30. Notably, the gas chambers 30 have inlet openings 32, which are substantially the same size, providing fluid communication with the gas generator via a passageway 36 for inflating the chambers 30. The air bag 10 also has two tethers 33 and 31 which are disposed at opposing ends of the air bag 10 along a lower portion of the air bag 10. Notably, Hammer fails to disclose the elements noted as missing from Heudorfer and accordingly the combination of Heudorfer and Hammer fail to establish a prima fascia case of obvious with respect to claims 3, 6 and 9. Moreover, and as disclosed above, neither Huedorfer nor Hammer fail to recognize or suggest providing an air bag that that is relatively soft at the initial stage of a collision for occupant protection and therefore, it would not be obvious for one skilled in the art to even try and make combine of the elements from Huedorfer and Hammer to achieve such an outcome. Accordingly, the rejections of claims 3, 6, and 9 and their dependent claims 11-17 are improper and should be withdrawn.

Claims 3, 5, 6, 8, 9, and 11-20 were rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,170,860 to Denz et al. (Denz) in view of Hammer. Claims 5, 8, 11 and 18-20 have been cancelled by the present

amendment and therefore, the rejections of claims 5, 8, 11 and 18-20 are now moot. In view of the amendments and remarks contained herein, Applicants respectfully submit that the rejections of claims 3, 6, 9, and 11-17 are traversed.

Denz discloses a gas air bag that offers protection over a period in time amounting to several seconds and that dissipates the amount of energy required on impact to cushion the occupant. The volume of the air bag is divided into several chambers including main chamber 30 and smaller chamber 32, which is in fluid communication with the main chamber by a choking port 36. The main chamber 30 is directly inflated by an inflator, and the smaller chamber 32 is inflated through the main chamber 30 via the choking port 36. *Denz* at Abstract. When the inflator is deployed, the air-tight main chamber 30 is completely filled with gas and when the occupant impacts the air bag, a portion of the gas is displaced from the main chamber 30, through the choked port 36 or passageway into the smaller chamber 32. *Id.* at Col. 1, lines 30-65. Since all of the gas is contained in the fixed volume of the main chamber 30 at the initial portion of the collision and a portion of this fixed volume of gas is further displaced into the smaller chamber 36 during the later part of the collision (e.g. impact of occupants head), the air bag function differently from Applicants' present invention. That is, Denz's air bag is relatively hard at the initial stage of the collision and is relatively soft at the later stage of the collision. As noted by the Examiner, Denz further fails to disclose that the main chamber 30 and the smaller chamber 31 are arranged such that a portion of all of these chambers 30 and 32 respectively overlap a virtual band provided by tethers for increasing tension and therefore, the Examiner depends on Hammer for such disclosure. However, as

discussed in the forgoing paragraphs, neither Denz nor Hammer fail to recognize or suggest providing an air bag that is relatively soft at the initial stage of a collision for occupant protection and therefore, it would not be obvious for one skilled in the art to even try and make combine of Denz and Hammer to achieve Applicants' present invention as recited. Accordingly, the rejections of claims 3, 6, and 9 and their dependent claims 11-17 are improper and should be withdrawn.

Accordingly, Applicants believe that claims 3, 6 and 9 and their dependent claims 11-17 are in a condition for allowance.

Claims 21-38 have been added and are supported in Figures 1-2 and 5-7. Applicants believe that these claims are allowable since they depend on claims 3, 6 and 9, and for their own specific elements recited therein.

Conclusion

In view of the above amendments and remarks, it is respectfully submitted that the present form of the claims are patentably distinguishable over the art of record and that this application is now in condition for allowance. Such action is requested.

Respectfully submitted,

Dated: October 2, 2009

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